

REMARKS

The Examiner has rejected Claims 1-5, and 11-12 under 35 U.S.C. §103(a), based on the contention that they are unpatentable over U.S. Patent No. 5,693,254, issued to Sieber et al (Sieber '254), in view of U.S. Patent No. 5,391,884, issued to Sieber et al (Sieber '884). Applicant respectfully traverses the Examiner's rejection. To expedite the prosecution of the application, however, Applicant has amended Claim 1 above so as to better clarify that claim, and to help differentiate the claimed invention from the cited references. As amended above, the claimed invention is not taught, disclosed or suggested by any of the cited references, either alone or in combination with one another.

The Examiner has previously recognized that Sieber '254 fails to show transparent binders and transparent phosphors at all. Instead, the Examiner combined Sieber '254 with Sieber '884 for showing the use of transparent binders, and DeBoer for transparent phosphors.

Applicant has amended Claim 1 to clarify that the binding agent is crystal clear, and based this amendment on Lines 24-25 of Page 7 of the description. Through this amendment, the present invention clarifies that the binding agent is not only transparent to light, but is completely transparent, or "crystal clear." The same can also be said of the phosphor particles, which are made from a mixed crystal that has the same crystal structure throughout its volume. Since the refractive indices the phosphor particles and the binding agent are essentially identical, the phosphor particles and binding agent together form a thin plate with no internal optical interfaces.

The crystal clear quality of the binding agent and of the volume of the phosphor particles provides a number of advantages that have not as of yet been recognized in any prior art references, including those references cited by the Examiner. Sieber '254 describes cesium-zinc

halide phosphors doped with other metals. Sieber '254 does recognize that the refractive indices of the binder and the phosphor can be matched, but fails wholly to consider that the binding agent and the phosphor particles should be crystal clear.

Similarly, Sieber '884 also fails to disclose both a crystal clear phosphor particle structure and binding agent. Sieber '884 describes BaGd_2O_4 phosphor particles that include small amounts of Tb or Sm. Sieber '884 does make reference to some organic materials relative to these specific phosphor materials, but does not include any teaching at all relative to a crystal clear quality of the binding agent.

Based on the above, Applicant submits that neither Sieber '254 nor Sieber '884 teach or disclose the present Claim 1 as amended.

Similarly, DeBoer '090 also does not teach or disclose the crystal clear binding agent as now claimed in Claim 1. DeBoer '090 teaches matching the refractive indices of the phosphor particles with a polymer forming a matrix for the phosphor particles. In DeBoer '090, a number of different monomers and polymers are disclosed as suitable matrix materials. By mixing two different co-polymerizable monomers, each of which by themselves would result in a polymer having a refractive index above versus below the refractive index of the phosphor particles, the overall refractive index of the two monomers together is adjusted to match the refractive index of the phosphor particles. Nowhere in DeBoer '090, however, is the concept of a crystal clear binding agent mentioned or even suggested. Thus, amended Claim 1 is also not taught or disclosed by DeBoer '090.

Applicant has additionally added new claims 14-20. Claim 14 is based on Figure 4 of the drawings, while Claim 15 and its dependents are based on specific methods for obtaining equivalent refractive indices between the phosphor particles and the binding agent. Claim 14

depends from the already-allowable Claim 1, while Claim 15 is in independent form. As such, we will address the currently-cited prior art relative to the new independent Claim 15 below.

Of the references cited by the Examiner, it appears that DeBoer '090 comes closest to the present invention, although it falls short of showing the present Claim 15 as claimed. Deboer '090 discloses adjusting the refractive index of the binding agent by mixing two binding agent components, with one having a refractive index greater than the phosphor particles, and the other a lower refractive index than the phosphor particles. DeBoer '090, however, does not even consider obtaining equal refractive indices of binding agent and phosphor

The present Claim 15, on the other hand, is specifically directed to a method for producing a storage crystal in which the refractive index of the binding agent and the storage particles are substantially the same. The inventor recognized that mixing binding agent components may not always be advantageous, since they have chemical characteristics in addition to their optical characteristics. In fact, the homogenous chemical qualities of a one component binding agent is preferable, but it is difficult to match the refractive indices of the storage elements. Thus, Claim 15 now recognizes that by mixing two salts of different refractive indices, a mixed crystal may be produced that has a refractive index that can be exactly adjusted to the refractive index of the binding agent. Further, as the two salts used for making the mixed crystal crystallize in the same crystal structure, there is no problem as to differing chemical or mechanical properties of the two salts. The mixed crystal, like a singular crystal material, will have a homogenous structure.

As can be seen, newly added Claim 15 is not taught, disclosed or even suggested by any prior art reference, including DeBoer '090, and should be in allowable condition as written.

Additionally, the remaining newly-added claims, namely Claims 16-20, all depend from Claim

15, and should therefore also be deemed allowable.

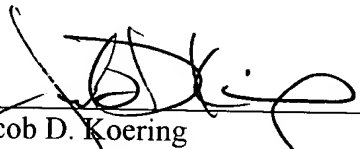
Based on the above, Applicant submits that all remaining claims in the application, namely Claims 1-20, should all be allowable at this time. Accordingly, reconsideration and passage to allowance is respectfully requested.

Should anything further be required, a telephone call to the undersigned, at (312) 226-1818, is respectfully invited.

Respectfully submitted,

FACTOR & PARTNERS, LLC

Dated: April 14, 2003



Jacob D. Koering
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on April 14, 2003.

Jacob D. Koering

